Clean set of claims for 09/917,384

We claim:

1. A composition comprising a substantially purified thermostable Gux1 peptide, said Gux1 peptide comprising a catalytic domain GH48, a carbohydrate binding domain (CBD) type III, and a carbohydrate binding domain (CBD) type II.

2. The composition of claim 1 wherein the Gux1 peptide is further defined as comprising a linker and a signal peptide.

3. The composition of claim 1 or 2 wherein the GH48 catalytic domain of the Gux1 peptide is further defined as having a length of about 637 to about 643 amino acids.

4. The composition of claim 1, 2, or 3 wherein the carbohydrate binding domain (CBD) type III of the Gux1 peptide is further defined as having a length of about 150 to about 156 amino acids.

5. The composition of claim 1, 2, 3, or 4 wherein the carbohydrate binding domain (CBD) type II of the Gux1 peptide is further defined as having a length of about 95 amino acids to about 105 amino acids in length.

6. The composition of claim 3 wherein the GH48 catalytic domain is further defined as the sequence of SEQ ID NO: 5.

7. The composition of claim 4 wherein the carbohydrate binding domain (CBD) type III is further defined as the sequence of SEQ ID NO: 4.

8. The composition of claim 6 wherein the carbohydrate binding domain (CBD) type II is further defined as the sequence of SEQ ID NO:7.

9. The composition of claim 1 further defined as comprising a sequence of SEQ ID NO: 4, SEQ ID NO: 5, and SEQ ID NO: 7.

10. A thermal tolerant Gux1 peptide having a sequence of SEQ ID NO: 1.

11. The Gux1 peptide of claim 10 further defined as having a sequence of SEQ ID NO: 2.

14. The composition of claim 1 wherein the Gux1 is further defined as comprising a nucleic acid sequence having at least 90% sequence identity to the nucleic acid sequence encoding an amino acid sequence of SEQ ID NO: 5.

15. The composition of claim 1 wherein the Gux1 is further defined as comprising a nucleic acid sequence having at least 80% sequence identity to the nucleic acid sequence encoding an amino acid sequence of SEQ ID NO: 5.

16. The composition of claim 1 wherein the Gux1 is further defined as comprising a nucleic acid sequence having at least 70% sequence identity to the nucleic acid sequence encoding an amino acid sequence of SEQ ID NO: 5.

17. The composition of claim 1 wherein the Gux1 is further defined as comprising a nucleic acid sequence having at least 90% sequence identity to the nucleic acid sequence encoding the amino acid sequence of SEQ ID NO: 7.

18. The composition of claim 1 wherein the Gux1 is further defined as comprising a nucleic acid sequence having at least 90% sequence identity to the nucleic acid sequence encoding the amino acid sequence of SEQ ID NO: 4.

19. The composition of claim 1 wherein the Gux1 is further defined as comprising a nucleic acid sequence having at least 90% sequence identity to the nucleic acid sequence encoding the amino acid sequence of SEQ ID NO: 6.

20. The composition of claim 1 wherein the Gux1 is further defined as comprising a nucleic acid sequence having at least 90% sequence identity to the nucleic acid sequence encoding the amino acid sequence of SEQ ID NO: 1.

21. The composition of claim 1 wherein the Gux1 is further defined as comprising a nucleic acid sequence having at least 90% identity to the nucleic acid sequence of SEQ ID NO: 2.

22. The composition of claim 1 wherein the Gux1 is further defined as comprising a nucleic acid sequence encoding a heterologous protein in frame with the Gux1 peptide of claim 1.

23. The composition of claim 22 wherein the heterologous protein in frame with the Gux1 peptide of claim 1 is further defined as a peptide tag.

24. The composition of claim 23 wherein the peptide tag is 6-His (SEQ ID NO: 8), thioredoxin, hemaglutinin, GST, or OmpA signal sequence tag.

24. The composition of claim 22 wherein the heterologous protein is a substrate targeting moiety.

25. The composition of claim 13 wherein the nucleotide sequence encoding the Gux1 is operably linked to a transcriptional or translational regulatory sequence.

26. The composition of claim 25, wherein the transcriptional or translational regulatory sequence comprises a transcriptional promoter or enhancer.

27. An isolated polypeptide molecule comprising:

a) a sequence of SEQ ID NO: 4;

b) a sequence of SEQ ID NO: 5;

c) a sequence of SEQ ID NO: 6;

d) a sequence of SEQ ID NO: 7;

e) a sequence of SEQ ID NO: 1; or

f) an amino acid sequence having at least 70% sequence identity with the amino acid sequence of a), b), c), d), or e).

28. The polypeptide molecule of claim 27, having at least 90% sequence identity with the amino acid sequence of a), b), c), d), or e).

29. A fusion protein comprising the polypeptide of claim 27 and a heterologous peptide.

30. The fusion protein of claim 29, wherein the heterologous peptide is a substrate targeting moiety.

31. The fusion protein of claim 29, wherein the heterologous peptide is a peptide tag.

32. The fusion protein of claim 31, wherein the peptide tag is 6-His (SEQ ID NO: 8), thioredoxin, hemaglutinin, GST, or OmpA signal sequence tag.

33. The fusion protein of claim 29, wherein the heterologous peptide is an agent that promotes polypeptide oligomerization.

34. The fusion protein of claim 29, wherein the agent is a leucine zipper.

43. A composition comprising the polypeptide molecule of claim 27 and a carrier.

44. A composition comprising the polypeptide molecule of claim 28 and a carrier.

68. The composition of claim 1 further comprising a carrier.

69. The composition of claim 1 wherein the substantially purified thermostable Gux I peptide is further defined as comprising a heterologous peptide or protein.

70. The composition of claim 69 wherein the heterologous peptide or protein comprises an immunoglobulin.

71. The composition of claim 69 wherein the heterologuos peptide comprises a histidine tag.

72. The composition of claim 69 wherein the heterologus peptide comprises a leucine zipper.

73. The composition of claim 69 wherein the heterologous peptide comprises a fusion protein.